LAUNDRY GUIDE

COMPILED BY

TROY LAUNDRY MACHINERY CO. LTD.

CHICAGO, TROY, NEW YORK
SAN FRANCISCO, SEATTLE

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CHICAGO. TROY. NEW YORK. SAN FRANCISCO. SEATTLE.
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PREFACE

AS the world's greatest builders of laundry machinery and carrying the largest and most complete stock of laundry supplies, we have published this little volume to assist our customers in improving the standard of their laundry work. ¶ It contains a great deal of information that should prove distinctly valuable and helpful to the trade. ¶ It does not, however, contain any elaborate essays or anything of that description, as we do not believe them necessary, and we are always ready to give our customers the benefit of our many years' experience. ¶ All questions regarding our machines or the laundry business in general will be promptly and cheerfully answered.

Troy Laundry Machinery Co., Ltd.

CHAPTER I

Essential Facts Regarding Water.—Tests for Minerals, Alkalies, Etc.

PURE WATER

No laundry should be without absolutely pure soft water. While in some localities the water may be soft, it may be impregnated with vegetable matters. On the other hand, it may be hard, caused by coming in contact with mineral substances. By filtering either of the above described waters, these foreign properties can be taken from it, leaving the water perfectly clear. Should the water treated in this manner be hard, it would easily be softened by following our directions.

METHODS OF WATER SOFTENING

Where muddy river waters are used, 98 per cent caustic soda should be added at the rate of 1 oz. to each 50 gallons of water, and the water allowed to settle before using. The precipitated lime will carry down the mud with it to the bottom of the tank. The pipe for drawing off the water should be about three inches from the bottom of the tank. It should also be provided with an outlet at the bottom, for cleaning out the lime and mud as often as necessary.

Where clear water is used, if it is impracticable to soften it in the tank previous to use, which is much the best method, it may be softened in the washing machine, as the action is immediate, but the caustic soda should be added before the clothes or soap is put in, great care being exercised not to use an excess of 98 per cent caustic soda when added direct to the washing machine. For the actual cleansing operation only a good, pure soap should be used.

SOFTENING WATER FOR GENERAL PURPOSES

One pound of pure powdered caustic soda added to 1,500 gallons of water of average hardness instantly softens it by removing the lime, magnesia and iron it contains. Pure soft water for all washing, dying or bleaching purposes means an enormous saving in time, soap and chemicals used.

TEST FOR ALKALINE OR ACID WATER

Dip a strip of red litmus paper into a test tube half filled with the water; if it does not turn blue the water is not alkaline. Now dip a strip of blue litmus paper into the water; if it does not turn red the water is not acid.

TEST FOR CARBONIC ACID

Pour about three-quarters of an inch of water into a test tube and then pour in just as much lime water; if there is carbonic acid the water will become milky. It will become clear again by adding a little hydrochloric acid.

TEST FOR SULPHUR COMBINATIONS

Pour enough mercury into a small glass bottle with flat bottom to cover the bottom, then pour in enough water to fill it for a depth of half an inch or more; stopper the bottle and let it stand for a few hours. If the mercury assumes a darker surface and upon shaking separates into a dark powder, the water contains sulphur combinations.

TEST FOR IRON

To some water in a test tube add one drop of ferrocyanide of potassium; it will color it blue if iron be present.

TEST FOR SULPHATE OF LIME (Gypsum)

Pour water in a test tube to the depth of one and a half inches and then add a little chloride of barium; if a white preciptate is formed, and it will not redissolve when you add a little nitric acid, sulphate of lime is present.

TEST FOR MAGNESIA

Fill a test tube about one-fourth or one-third full of water, hold it with the tube holder and bring it to a boil over the spirit lamp; then add the point of a knife full of carbonate of magnesia and a very little phosphate of soda; if magnesia is present it will form a white precipitate; but, as it may not do so at once, it will be best to set it aside for a few minutes.

TEST FOR LEAD

Fill a test tube full of water and add a few drops only of tincture of cochineal. If there be only a trace of lead in the water, it will be colored blue instead of pink.

TEST FOR COPPER

Add to some water in a test tube a little filing dust of soft iron, and a few drops of chloride of ammonia; a blue colorization denotes the presence of copper.

MAIN FACTORY, CHICAGO, ILL.

TEST TUBE HINTS

Remember to rinse a test tube out thoroughly before using it with the water that you are about to test and after making one test, rinse out the tube thoroughly with water, using the tube brush if necessary.

The soap solution can be prepared by putting some fine scrapings of white curd (to be secured from a druggist) into a bottle and pouring alcohol upon it; then cork the bottle and set it one side, shaking it often for a few days, until it is all dissolved; then add a little more soap, and if you find you have too much, add a little alcohol, so as to just dissolve it.

Lime water can be prepared by slaking a small lump of freshly burned lime with half its weight of water in a vegetable dish; then take some of the slaked lime and put it in a bottle with some cold distilled water (which can be obtained by condensing steam), shaking it occasionally; then let the undissolved portion subside, draw off most of the clear liquid, and keep it tightly stoppered in a clean bottle.

CHAPTER II

Soaps.—The Best for Laundry Use.—Formulas for Making.

The soap we sell is guaranteed to be a pure and thoroughly honest one, made of the very best tallow. We have always urged our customers to make their own soap because they will then obtain a uniform soap, provided the best prime tallow is used. Any one at all familiar with the laundry business and especially those that are good judges of laundry work realize fully that a good, honest, uniform soap is one of the greatest essentials in a laundry, and especially in those laundries that desire to do a fine grade of work.

In this age of adulterations it is almost impossible to buy an honest soap, because it is so easy and so tempting to make and sell a cheap adulterated article. There are many dealers in soaps that advertise an article as pure at much less price than prime tallow is worth. Always remember that a pure tallow chip soap cannot be sold at a price much, if any, below the market

price of prime tallow and the market price of prime tallow should govern the price of pure tallow soap chips.

We have always urged our customers to use the best supplies obtainable because it is the most economical in every way. As the freight or expressage on any cheap adulterated article is the same as on the genuine article, it certainly is poor economy to buy cheap laundry supplies of any kind. Some soaps contain more moisture than others, and under these circumstances it is always advisable to weigh at least a sample of the soap when purchased, lay it aside for a reasonable length of time and then weigh it again, for in this way one can ascertain the amount of moisture in the different soaps purchased. If the trade would watch the soap they use more carefully, much better results in the color and clearness of their work would be obtained, and black specks would be a thing of the past.

FORMULA FOR TESTING SOAP

The following is a simple process for the valuation of soap: Cut a piece across the center of the bar and from this shave as a sample 1 gram of the soap. Place this in a graduated test tube of 15 c. c. capacity and add 10 c. c. of a mixture of equal parts of alcohol and distilled water. Place the test tube in warm water and shake gently until the soap is dissolved. All foreign substances, such as starch, excess of soda, talcum, chalk, etc., will remain undissolved and settle to the bottom. Pure soap will yield a fairly clear solution without appreciable precipitate.

Now add 5 c. c. of 30 per cent acetic acid, shake well and let the test tube stand upright and undisturbed for twelve hours. From pure "grain soap" a layer of 1 c. c. of fatty acid will rise to the top. If sodium silicate is present, it will separate but in a gelatinous form upon the addition of the acetic acid. The same result will follow if resin soap is present. The presence of free sodium carbonate is indicated by the effervescence of the liquid upon the addition of the acid.

SOAP

We give herewith a full description of the process of making a pure potash or soda soap. These formulas are not experiments. Many laundries throughout the country are now making their own soap by them, effecting thereby

TREASURER AND GENERAL MANAGER'S PRIVATE OFFICE

GENERAL OFFICE

quite a saving in their soap bill, as well as obtaining the very best results.

The great difficulty with which all launderers making their own soap have now to contend is the fact that it is almost impossible to get a perfectly uniform and reasonably pure soap. Probably in the whole range of manufactured articles there is none with which the "demon of adulteration" has been more busy than with soap. This is an age of cheap articles and soap makers have vied with each other in producing the cheapest soap possible, upon the principle that the cheaper the soap is the better it will sell and also what is more important to them, the greater is the profit to be got out of it. Certain results have to be obtained in the handling and finishing of all goods, and what is more, they must be economically obtained; therefore, an impure and not strictly uniform soap will not do at all. Such soaps are made for sale and not for use.

There is only one way nowadays of overcoming this difficulty and that is for each manufacturing consumer to make his own soap and thus obtain exactly what is required; a pure and uniform soap, just suitable for the special purpose for which it is intended. This would have been impossible some years ago, but with the strong, pure Caustic Soda and Caustic Potash that we sell, nothing is easier, as the simple directions will show.

We would, however, here caution laundrymen against the impure and cheap powdered, or granulated Caustic Soda and so-called "pure" Caustic Potash, now offered to the trade by many laundry supply dealers. It is impossible to make genuine laundry soap that will give satisfaction by our formulas unless pure potash and soda are used. We get our Caustic Soda and Caustic Potash direct from England, specially packed for us by the manufacturers there, who ship the goods to us direct. We are, therefore, prepared to guarantee results with the Soda and Potash that we supply.

We can do this with confidence, after many years experience in this business of making laundry soap, which was first introduced to the trade by us nearly 30 years ago.

FORMULA NO. 1
Cold Process

Break up the contents of a 20-pound can of real

Caustic Potash, and empty them into an earthenware or iron vessel with two gallons of water. Stir, and the potash dissolves almost immediately, heating the water. Let the lye thus made cool until just warm to the hand (say 80° F.). Melt 40 pounds of tallow or grease, which must be free from salt, and let it cool until fairly warm to the hand (say 120° F.). Now pour the caustic potash lye into the melted tallow, stirring for one or two minutes with a wooden stirrer, until both are thoroughly mixed and smooth in appearance. This mixing can be done in the pan or kettle used to melt the tallow, or in a wooden tub or half an oil barrel. Cover up well and put away in a warm place for two or three days (stirring again the second day to thoroughly remix), during which time the mixture saponifies.

This gives about 80 pounds of concentrated potash soap. For use it should be remelted by boiling in a kettle with three times its own weight of water until all the concentrated potash soap is dissolved, thus giving a jelly soap. If for use in a washing machine, it is better to dissolve the concentrated potash soap in 15 to 16 times its weight of water.

This is the finest laundry machine soap obtainable.

FORMULA NO. 2
Short Steam Boiling Process

Take 120 pounds of tallow and put it into an iron tank holding about 80 gallons. Turn an open steam pipe into it and melt the tallow. In another smaller tank dissolve a 50-pound can of caustic potash in 20 gallons of cold water. As soon as the tallow is melted, run in this lye. Continue gently boiling with the steam pipe for about twenty minutes, when the soap will become thick and completely made. Leave standing till the next day and then boil up again with about 40 gallons of water. This soap gives a splendid lather that lasts for hours.

The above soap is for washing linens or cottons in a washing machine. To make a neutral or mild soap for washing flannels by this process, 200 pounds instead of 120 pounds of tallow must be taken.

FORMULA NO. 3
For Use in Power Washers

Take 400 pounds of best tallow free from salt and put it into an open tank holding about 500

gallons, then turn in open steam to melt the tallow. Dissolve in a separate tank, placed above the mixing tank, 50 pounds of powdered 98 per cent Caustic Soda and 150 pounds of pure Caustic Potash, in 200 gallons of water, by stirring them together until dissolved. Take care that none of the potash or soda settles to the bottom without being dissolved. Now slowly run in all this potash soda lye into the mixing tank holding the melting tallow, at the same time boiling carefully with an open steam pipe for about three hours until sufficient steam is added during the boiling process to make the total water used equal to about 340 gallons and the total weight of the batch of soap made about 4,000 pounds. For use in the machine add about five pounds of soap to the gallon of water. This formula gives a most excellent soap for power machines and far superior to any soda soap. It is used exclusively in one of the largest and best appointed laundries in the United States.

FORMULA NO. 4
Hard Soap

50 pounds of powdered 98 per cent Caustic Soda.
200 pound weight (20 English gallons) of water.
325 pounds of pure tallow

Empty the 50 pounds of 98 per cent powdered Caustic Soda into any iron vessel, with 20 gallons or 200 pound weight of water. Stir and it dissolves almost instantly, heating the water. Let the lye thus made cool until just warm to the hand (say 80° F.). Melt the 325 pounds of tallow, or clean rendered grease, which must be free from salt, and let it then cool until fairly warm to the hand (say 120° F.). Now pour the caustic soda lye into the melted grease or tallow, stirring with a flat wooden stirrer, about three inches broad, for one or two minutes, until the melted tallow and lye are thoroughly mixed and smooth in appearance. This mixing may be done in the pan or boiler used to melt the tallow or in a wooden tub.

Now pour into boxes of convenient size or moulds, or, if not required afterwards in bars, cover up the tub itself containing the mixture with blankets, to keep in the heat, and leave for three or four days standing in any fairly dry or warm room. During this time the mixture of lye and grease slowly saponifies and gives about 575 pounds of good, hard scouring soap. This

soap should not be used for a few days after being made. It also improves by being cut up into bars and being kept for a few weeks in a dry room. Its bathing and washing properties can also be much more improved by the addition of 10 pounds of refined carbonate of potash, added to the 20 gallons of water originally used to dissolve the 50 pounds of 98 per cent powdered Caustic Soda.

FORMULA NO. 5
Short Boiling Process

Throw 70 pounds of tallow into an iron tank or kettle holding about 50 gallons. Put in an open steam pipe and melt. In another smaller iron tank stir up and dissolve one 10-pound can of powdered 98 per cent Caustic Soda in 15 gallons of water. As soon as the tallow is melted run in this lye and boil with a steam pipe for about 20 minutes, when the soap will become thick and completely made. Turn on steam gently or the soap will boil over. Have a can of cold water handy to throw in, to keep it down if required.

Now for use in a washer dissolve 25 pounds of this soap in 40 gallons of water with one-half pound of 98 per cent Caustic Soda and boil a few minutes, when it will be ready for use.

FORMULA NO. 6
Short Mixing Process

Empty a 10-pound can of powdered 98 per cent Caustic Soda into four gallons of water, and stir until dissolved. Let the lye thus made cool. Melt 70 pounds of tallow and then let it cool until just warm to the hand. Pour the caustic lye into the melted tallow and stir for a few minutes, until both are thoroughly mixed and smooth in appearance. Cover up to keep in the heat, and leave standing for two days, when the soap will be found made. For laundrymen the short boiling process will be found the quickest and most effective.

FOR THE USE OF SOAP CHIPS

In order to cope with the various problems with which the user of liquid soap in a laundry has to deal, it is well that a proper understanding of the article in question is had.

The first requirement of a soap for use in the laundry is that it must be absolutely and thoroughly saponified regardless of and above everything else. Anything less than complete saponi-

COST DEPARTMENT AND FACTORY SUPERINTENDENT'S OFFICE

DRAUGHTING DEPARTMENT

fication means high cost through waste of materials (neutral salts contained therein) from which no good can come, and a great loss of true soap, by virtue of its having to attack the impurities contained within itself as well as those contained in the water and articles to be washed. It means poor and unsatisfactory work, except at the expense of much time, coupled with the ever present danger of chemical combinations that cause much injury and damage to the fibers and colors.

When the soap is dissolved in water, it is split up in two parts, an acid soap and an alkaline soap. The alkaline soap is believed to release the dirt by emulsionizing,—a sort of lubricating process by which the action of the water in absolution will cause the dirt to release itself from the fibers and become absolved therein; while the acid soap, especially in hot water, is believed to form itself into microscopically small flakes, and the particles of dirt adhering to them are carried off in the rinse. The condition of the water used has great effect upon the action of the soap. Hard water, such as we find in ordinary use, contains more or less of lime and magnesia; as they are present in greater or less quantity, corresponding extreme care must be exercised by the soap user, as the sulphuric and carbonic acid, forming a part of the compounds, decompose the soap, combining with the alkali of same and setting free the fatty acids, which combine almost immediately with the lime of magnesia, forming insoluble soap, similar to axle grease.

DIRECTIONS FOR PREPARING TROJAN NEUTRAL SOAP CHIPS

Where you have formerly used 50 pounds of soap chips and 100 gallons of water, use 30 pounds of Trojan Neutral Soap Chips and 30 pounds of Wyandotte Yellow Hoops, made up as follows:

Run water in tank to one-third tank capacity; turn on steam and add 30 pounds of Trojan Neutral Soap Chips. When soap is thoroughly dissolved, gradually fill tank with water, leaving steam on, and at the same time sprinkle over the surface of the water 30 pounds of Wyandotte Yellow Hoops. When tank is full, turn off steam and see that same is thoroughly stirred; the soap is then ready for use.

FORMULA NO. 2

For 100 gallons of soap, make up as follows; use ½ pound of soap for each gallon of water:

First fill tank to one-third tank capacity; then put in 50 pounds Trojan Neutral Soap Chips and boil thoroughly until dissolved, then add 3 pounds caustic soda, dilute same in pail, add to tank and thoroughly boil; then fill tank to tank capacity. While the tank is being filled, see that same is thoroughly stirred.

CHAPTER III

Bleach.—How to Prepare.

To prepare a soft bleach in a 30-gallon bleach jar use 10 pounds of Chloride of Lime, preferably a 10-pound can of Greenbank's brand of Chloride of Lime, and 15 pounds of Wyandotte Yellow Hoops.

Mix the contents of a 10-pound can of Greenbank's Chloride of Lime with enough cold water to form a paste. This must be mixed thoroughly until it is smooth and all the lime thoroughly moistened. Then add sufficient cold water to half the capacity of your jar (about 15 gallons). It is important that this solution be stirred until thoroughly dissolved. Then dissolve 15 pounds of Wyandotte in a pail of lukewarm water, stirring thoroughly until the Wyandotte is thoroughly dissolved. Add this to the lime solution and again thoroughly stir. Then add sufficient cold water to fill the bleach jar, stir thoroughly and allow the same to stand for at least six hours, after which skim off any foreign substance that will form on

the top of the bleach, which will leave a clear liquid of a pinkish cast. Never use the sediment.

By carefully following these directions you will find a very small amount of sediment remaining in the bottom of the jar and the full benefit will be obtained from the bleach properties.

This is a soft bleach which can be used in the second suds without lowering the suds. By using the bleach in the second suds it gives a saving of time in the washing process, but it can be used as a bleach in the clear liquid, if so desired.

A bleach jar should be protected by a cover to prevent any foreign substances getting into it.

By the use of Wyandotte Yellow Hoops in bleach making, the ill effects of chloride of lime are counteracted, and we recommend this formula of bleach in all instances and in all waters. Nowadays a hard bleach is very seldom used, for time and experience have proven that it is injurious to the goods.

CHAPTER IV

Bluing.—Formulas for Preparing Aniline and Ball Blues.

FORMULA FOR PREPARING ANILINE BLUE

Take four ounces of Troy regular or special blue and dissolve in soft or distilled water, pour into four gallons of soft or distilled water when dissolved and put into starch kettle and let it come to a boil, take out while hot and add 16 ounces of acetic acid. It will not be found necessary to strain this blue, as it will not settle nor streak. It will be ready to use as soon as cold. If you do not get a color that suits you with acetic acid as a sour in the washer, use oxalic; if the color then does not suit, you can use hydrochloric or sulphuric—waters differ, and as they do, so does your color. If the goods are properly rinsed the acids will hurt them but very little. We recommend the use of the acetic, but in case you cannot get the color desired you can use the stronger.

Dissolve one ounce of aniline blue in two gallons of boiling water, and, when thoroughly dissolved, add one-half pint of acetic acid. Add by measure, either into the water or by stirring it into the starch, sufficient of the liquid bluing to obtain the tint desired.

When you blue your goods in the washing machine, it is very essential that they be thoroughly rinsed, as Aniline is very sensitive and easily affected by alkalies and bleach. If bleach has been used or caustic soda to soften the water, use a little hyposulphite or bisulphite of soda in the last rinsing water before putting in the blue.

Always pour the bluing in the machine when the cylinder is running toward you.

Condensed or rain water should be used to make the bluing.

DIRECTIONS FOR USING BALL BLUE

Wrap one or more balls in a flannel or linen rag and keep stirring under water until the latter is sufficiently colored.

Our ball blue has the repute of being the best manufactured, leaves no sediment and is guaranteed perfectly harmless and free from sediment.

CHAPTER V

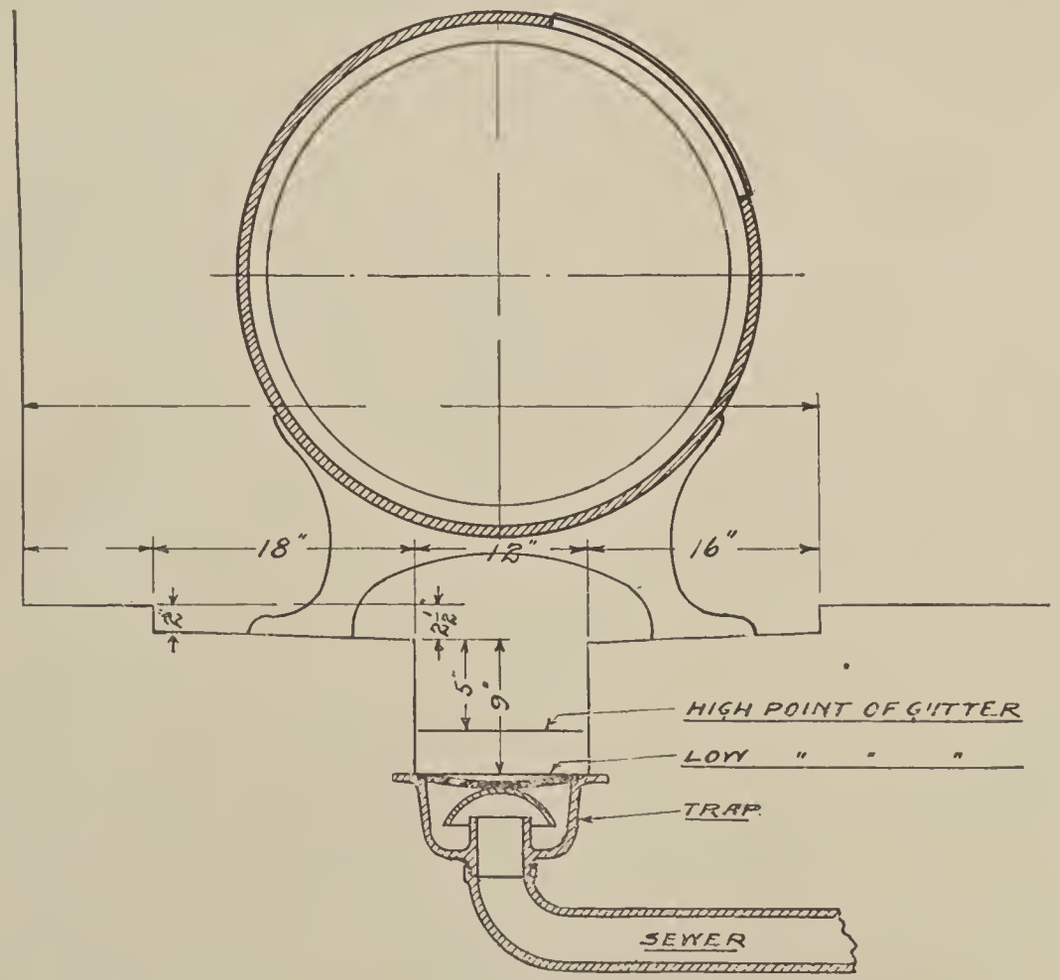
Formulas for Disinfecting and Washing Different Classes of Goods.

DISINFECTING

Sometimes it is necessary to disinfect clothing before washing. Extra precautions must be taken in case of laundry work, as serious consequences might result from carelessness. An ordinary and simple method of disinfecting is to plunge the clothes into boiling water and boil for half an hour. After this process most germs, if any were present, will be killed. Anthrax germs will have to be boiled a second time. For common use, where a solution is required, corrosive sublimate tablets come already prepared. These simply need to be dissolved in water to make a solution of the required strength; i. e., one part to 2,000.

Handkerchiefs which have been used for colds should be soaked in a disinfectant and washed separately before putting them in with the rest

MAIN SALESROOM — WESTERN HALF



TROY WASHROOM GUTTER

The above gutter would have ample depth to care for ten washers.
Less machines, figure depth accordingly.

of the clothing for boiling. Salt water is a good disinfectant solution.

The sterilizing and disinfecting machines which we build have proved thoroughly successful in performing this operation so important to the public health. A careful inspection of their essential points is solicited.

WASHING GOODS IN POWER WASHERS

It is always advisable, especially in a new machine, to cleanse it with a strong bleach, filling the machine while in motion about one-third full of water. Draw this bleach off and repeat, using strong soap instead of the bleach. Give the machine a thorough cleansing for about three or four hours.

If directly connected steam is used to heat water in the washer, care should be taken not to turn cold water too fast, otherwise soap grease spots (black specks) will be formed in the linings of shirts, collars and cuffs.

When bluing goods in the machine, be sure that they are thoroughly rinsed, as bluing is very sensitive and easily affected by alkali. Have the water in the machine of about the same depth that is used for rinsing. The operator, however, should use judgment in this matter, for the amount of water depends altogether on the amount of goods in the machine; too much water will cause the goods to float. One should be able to hear them fall in the water before adding blue. Pour the bluing in the machine while it is in motion and when the cylinder is running toward you.

FORMULA FOR WASHING WHITE GOODS

One Hundred Shirt Washer

1. Run lukewarm water into the washer so as to give 1½ inches in the cylinder. Add soap, run 15 minutes, and discharge.

2. Run hot water into the washer so as to give 1½ inches in the cylinder. Add 1 gallon Wyandotte Yellow Hoops solution or its equivalent, 1 pound in dry form. Run at least 15 minutes, and discharge.

3. Run enough hot water into the washer to give 1½ inches in the cylinder. Add one-half the usual amount of bleach (the formula for this has already been given), and run 5 minutes. Then put in sufficient soap to cause and keep up a lively suds. Turn on steam and raise temperature gradually to the boiling point. Run 25 minutes (35, if

MAIN SALESROOM — EASTERN HALF

very dirty), discharge and drain well.

4. Run hot water 180° F. into the washer, so as to give 6 inches in the cylinder. Run 5 minutes, discharge and drain well.

5. Repeat the preceding.

6. Run enough hot water into the washer to give 3 inches in the cylinder. Dissolve 6 ounces oxalic acid in a separate pail and add. Turn on steam gradually and boil for 10 minutes (this decomposes the acid), and then run in water enough to cover the clothes; add blue and run 20 minutes. Discharge.

7. Give a 5-minute hot rinse.

8. Give a 5-minute cold rinse.

FORMULA FOR WASHING WHITE GOODS
One Hundred Shirt Washer

1. Run cold water into the washer so as to give 4 inches in the cylinder. Run 5 minutes, and discharge.

2. Run lukewarm water into the washer so as to give 3 inches in the cylinder. Put 2 pounds of Wyandotte Yellow Hoops in the center of the clothes. Start the machine, turning on the steam, and bring the temperature gradually up to about 130° F. Run 20 minutes, and discharge.

3. Run hot water into the washer so as to give 6 inches in the cylinder. Run 5 minutes, and discharge.

4. Run warm water into the washer so as to give 3 inches in the cylinder. Add enough soap to produce a good suds. Turn on steam and bring gradually to a boil. Run 20 minutes and discharge.

5. Run enough warm water into the washer to give 3 inches in the cylinder. Add bleach, turn on steam and bring gradually to boiling point. Run 10 minutes, and discharge.

6. Give 5-minute hot rinse.

7. Repeat the preceding.

8. Run hot water into the washer so as to give 4 inches in the cylinder. Add 5 ounces of oxalic acid, dissolved in a pail of water (use the pail only for this purpose), put in washer and turn on steam gradually. Boil from 10 to 15 minutes, and discharge.

9. Run in enough hot water to give 6 inches in the cylinder. Add your blue, using a shade over what you wish, run 10 minutes, and discharge. Follow with a short hot rinse and a short cold one. This will give you the shade you wish.

FORMULA FOR WASHING WHITE GOODS

One Hundred Shirt Washer

1. Run enough cold water into the washer to give 6 inches in the cylinder; run 5 minutes; discharge and drain well.

2. Run enough lukewarm water into washer to give 2 to 3 inches in the cylinder. Add ½ to 1 pound Wyandotte Yellow Hoops (either dry or in solution), depending on clothes and water, and run 5 minutes. Add sufficient (preferably neutral) soap to make a good suds and turn on steam, heating gradually to 90° F. Run 15 minutes, discharge and drain well.

3. Run enough warm water into the washer to give 2 to 4 inches in the cylinder, add 1 pound Wyandotte Yellow Hoops (either dry or in solution), run 10 minutes, and discharge.

4. Run enough hot water (110° F.) into the washer to give 2 inches in the cylinder, add bleach and run 5 minutes. Then add soap enough to make a good suds, turn on steam and bring gradually to the boiling point. Run 30 minutes; discharge and drain well.

5. Run hot water into the washer so as to give 6 inches in the cylinder. Run 5 minutes; discharge; drain well.

6. Repeat the preceding.

7. Sour and blue your own way.

FORMULA FOR WASHING WHITE GOODS

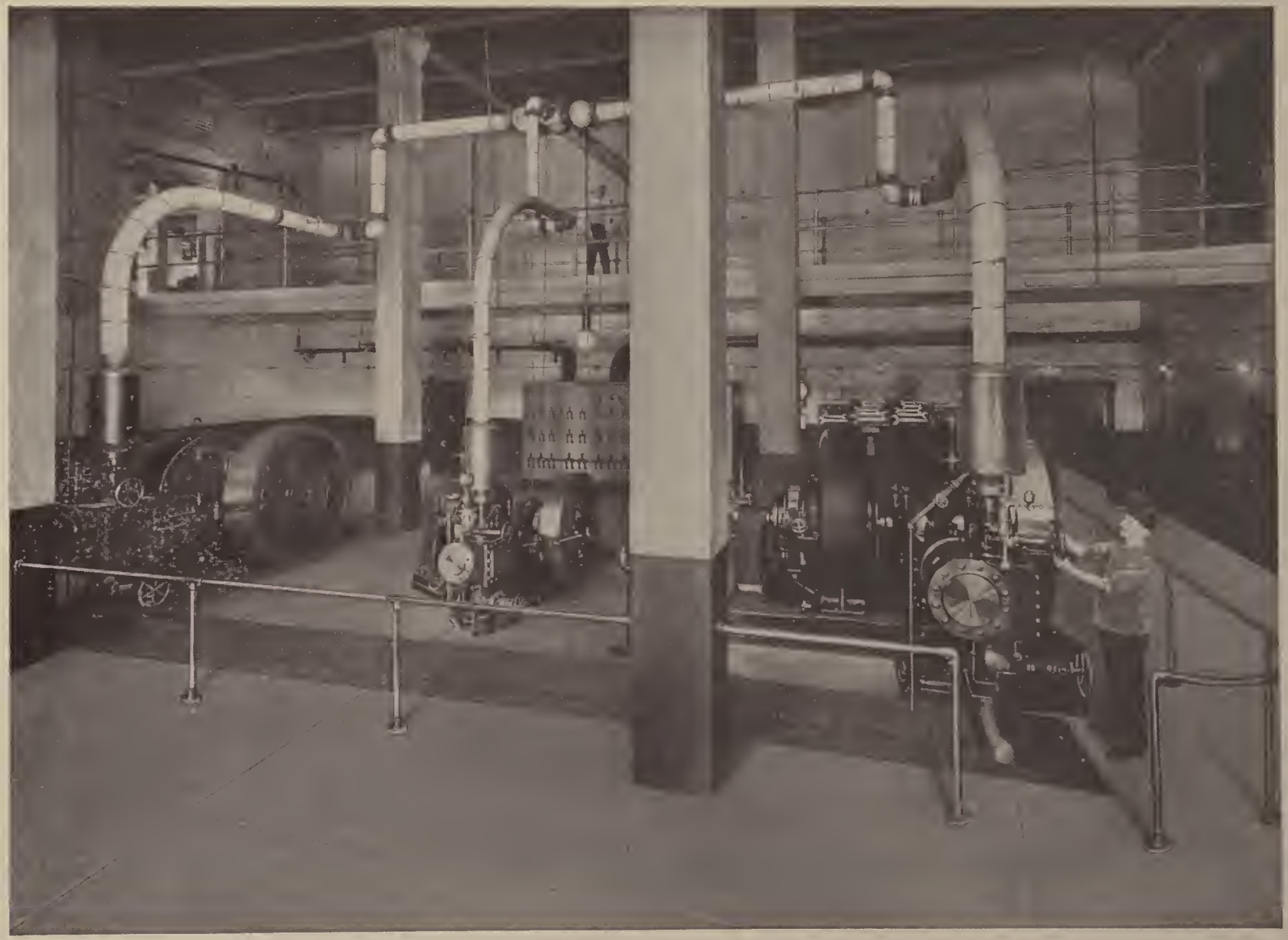
One Hundred Shirt Washer

1. Run enough cold water into the washer to give 6 inches in the cylinder. Run from 8 to 10 minutes. Discharge and drain well.

2. Run enough warm water into the washer to give 2 to 3 inches in the cylinder. Add (either dry or in solution) 1 to 2 pounds of Wyandotte Yellow Hoops. If used dry, the washer should be opened and the Wyandotte placed in the center of the goods. Start the machine and run it 5 minutes. Add enough soap to make and maintain a lively suds. Keep the temperature of the water at 120° F. Run from 15 to 20 minutes; discharge and drain well.

3. Run enough warm water into the washer to give about 6 inches in the cylinder. Run about 5 minutes; discharge and drain well.

4. Run warm water into the washer so as to give 2 to 3 inches in the cylinder. Add 1 to 2 quarts of bleach and run 8 to 10 minutes. Add



ENGINE ROOM

soap sufficient to produce and keep up a lively suds. Turn on steam gradually until brought to the boiling point. Then shut it off and run 10 to 20 minutes. Discharge.

5. Run hot water into the washer so as to give 6 inches in the cylinder. Run 5 minutes, and discharge.

6. Repeat preceding.

7. Run hot water into the washer so as to give 4 inches in the cylinder. Add 6 ounces of oxalic acid, dissolved in a pail of hot water, to the rinse and then turn on the steam gradually and bring to a boil. Run 15 minutes. Discharge and drain well.

8. Give two 5-minute rinses as follows: Run boiling water into the washer so as to give 6 inches in the cylinder. Run each 5 minutes, and discharge.

9. Run warm water (of a temperature of 90° to 120° F.) so as to give 6 inches in the cylinder. Add 2 to 3 ounces 28 per cent acetic acid and to this the blue needed. Run for 15 minutes, and discharge. Stopping machine, flood the garments with cold water and allow them to revolve three or four times. Then stop the machine again and discharge or take the clothes out, leaving the water, if you wish, for the first rinse of the next run.

This method of warm bluing water permits the maintenance of a perfect shade. All that is necessary is to get the amount of blue and acetic acid required to produce the desired color in a load of 100 shirts and then reduce or increase this, depending on the size of the load. Excellent results are being secured in some cases by using the oxalic acid in the second instead of the third rinse.

FORMULA FOR WASHING WHITE SHIRTS, COLLARS AND CUFFS

Run cold water into washer so as to give 4 inches in cylinder; rinse the garments 5 minutes. Discharge, draining well.

2. Run enough warm water into the washer to give 2 inches in the cylinder. Add 1 to 2 pounds of Wyandotte Yellow Hoops in solution. Keep this temperature and run for 15 minutes. Discharge and drain well.

3. Run hot water into the washer to give 2 inches in the cylinder, and then add enough soap to make a good suds. Turn on steam gradually and heat to at least 180° F. Discharge and drain well.

4. Give a good hot rinse.

5. Add bleach prepared according to the formula given in Chapter 3. Run 10 minutes, and discharge.

6. Give a good hot rinse.

7. Repeat this rinse.

8. Run hot water into the machine, so as to give 6 inches in the cylinder, adding the proper amount of oxalic acid. Heat to highest temperature possible. Run 10 minutes, and discharge.

9. Run in water and blue as you usually do.

FORMULA FOR MAKING WYANDOTTE YELLOW HOOPS SOLUTION

Fill a separate tank or barrel with hot water. Add to same as many pounds of Wyandotte Yellow Hoops as the tank contains number of gallons. Stir this solution until the water has taken up all of the Wyandotte Yellow Hoops. Every gallon of this solution you use will be equivalent to 1 lb. of Wyandotte Yellow Hoops in dry form, which makes it easier for you to figure and regulate the quantity of Wyandotte Yellow Hoops you are using.

Use this for softening water, use it before the first suds in washing, use it for washing flannels, use it for setting colors, and use it for building soap and soap stock.

It requires less Wyandotte Yellow Hoops to break warm water than it does cold, but whether you use Wyandotte Yellow Hoops dry or in solution, enough should be used to make the water feel soft to the hand.

FORMULA FOR WASHING SHIRTS AND COLLARS

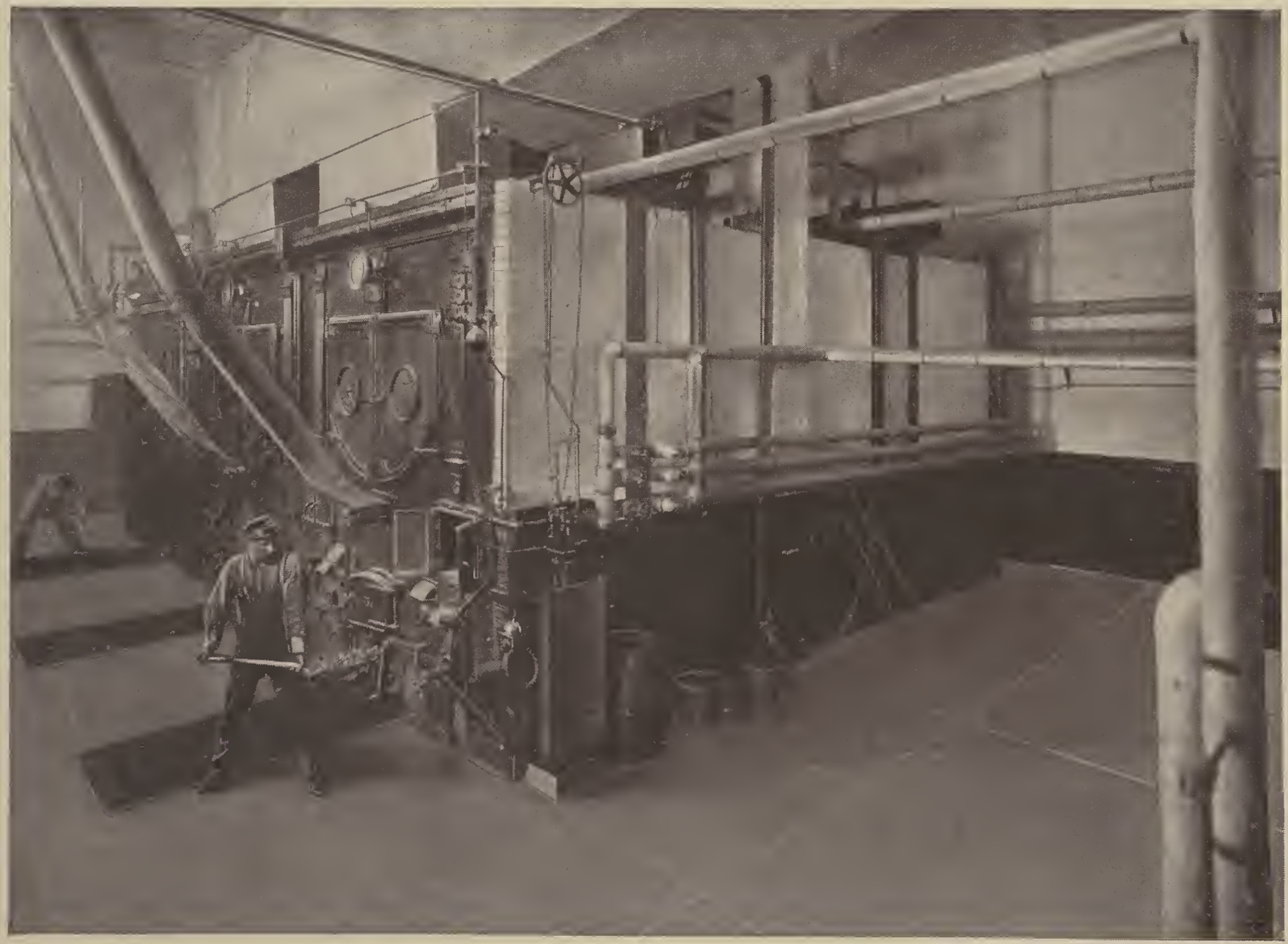
One Suds

1. Run cold water into the washer so as to give four inches in the cylinder. Run five minutes and discharge.

2. Run lukewarm water into the washer so as to give three inches in the cylinder, placing two pounds Wyandotte Yellow Hoops in the center of the clothes. Start the machine, turn on the steam gradually, and bring the temperature up to a good warmth. Run 20 minutes and discharge.

3. Run hot water into the washer so as to give six inches in the cylinder. Run five minutes, discharge and drain well.

4. Run hot water into the washer so as to give two inches in the cylinder. Add bleach made with Wyandotte Yellow Hoops in accordance with formula given elsewhere. Run 10 minutes. Add



BOILER ROOM

enough soap to make good suds; turn on steam and bring gradually to the boiling point. Run 20 minutes, discharge, and drain well.

5. Run enough hot water into the washer to give six inches in the cylinder. Run five minutes, discharge and drain well.

6. Repeat the preceding.

7. Run enough warm water into the washer to give four inches in the cylinder. Add eight to ten ounces of acetic acid, dissolved in a pail of water (have a pail used only for this purpose). Run 10 minutes and then add a little more blue than the shade you require. Follow with a short cold rinse, which will even up the color.

ONE SUDS FORMULA FOR WASHING WHITE SHIRTS, COLLARS, CUFFS AND FLAT WORK

1. Run cold water into the washer to give four inches in cylinder; give a five minutes' cold rinse. Discharge and drain well.

2. Turn on hot water so as to give two inches in the cylinder. Add one to two pounds of Wyandotte Yellow Hoops in solution. Run 15 to 20 minutes. Discharge.

3. Give five minutes' hot water rinse. Discharge.

4. Turn warm water into the washer so as to give two inches in the cylinder, and then add one-half gallon Wyandotte Yellow Hoops in solution. Add bleach, run five minutes and then put in enough soap to make a lively suds. Turn on steam gradually and heat to at least 180° F. Run 20 minutes and discharge.

5. Give two five-minute hot rinses.

6. Sour and blue in the usual way.

FORMULA FOR WASHING CUSTOM NEW WORK

One Hundred Shirt Washer

1. Run cold water into the washer so as to give five inches in the cylinder, after thorough saturation of the garments. Add two pounds Wyandotte Yellow Hoops, either dry or in solution. Run 15 minutes and discharge.

2. Run lukewarm water into the washer so as to give five inches in the cylinder. Add one pound of Wyandotte Yellow Hoops, either dry or in solution, for every 100 shirts or their equivalent. Run 30 minutes and discharge.

3. Run hot water (160° F.) into the washer, so as to give five inches in the cylinder. Add two quarts of bleach, run five minutes and then put in sufficient soap to produce and keep up a good suds. Run 45 minutes and discharge.

IRONER DEPARTMENT

4. Run hot water into the washer so as to give eight inches in cylinder. Run five minutes and discharge.

5. Run hot water into the washer so as to give eight inches in the cylinder. Dissolve (using separate pail) six ounces of oxalic acid. Run 10 minutes and discharge.

6. Run hot water into the washer so as to give eight inches in the cylinder. Add 12 ounces of acetic acid. After running about two minutes, add the blue and run 20 minutes. Discharge.

7. Run cold water into the washer so as to give eight inches in the cylinder. Rinse thoroughly until your color reaches the desired shade.

FORMULA FOR WASHING COLORED GOODS

1. Run lukewarm water into the washer so as to give six inches in the cylinder. Run 10 minutes; discharge and drain well.

2. Run lukewarm water into the washer so as to give three inches of water in the cylinder. Add one to two pounds of Wyandotte Yellow Hoops, either dry or in solution. After running this for 10 minutes, add soap, turn on steam gradually, bringing the temperature to 100° F. Run 15 to 20 minutes, depending on the condition of the clothes; discharge and drain well.

3. Run lukewarm water into the washer so as to give three inches in the cylinder. Add soap, turn on steam and bring gradually to 160° F. Run 20 minutes, discharge and drain well.

4. Run warm water into the washer so as to give six to eight inches in the cylinder. Add one-half pound Wyandotte Yellow Hoops, either dry or in solution. Run 10 minutes, discharge and drain well.

5. Give five minutes' warm rinse.

6. Rinse and blue the usual way.

FORMULA FOR WASHING COLORED GOODS

1. Run warm water (90° F.) into the washer so as to give four inches in the cylinder. Add enough soap to make a good suds. Run 15 minutes and discharge.

2. Run warm water (110° F.) into the washer so as to give four inches in the cylinder. Add one gallon of Wyandotte Yellow Hoops solution. Run 15 minutes and discharge.

3. Run warm water into the washer so as to give three inches in the cylinder. Add enough

IRONER ASSEMBLING DEPARTMENT

soap to make good suds. Run 20 minutes and discharge.

4. Run warm water into the washer so as to give six to eight inches in the cylinder. Run five minutes and discharge.

5. Run cold water into the washer so as to give six to eight inches in the cylinder. Run five minutes and discharge.

6. Run cold water into the washer so as to give eight inches in the cylinder. Add blue and run the regular period. The use of cold water in this last two rinses will make the colors brighter.

Note. Do not get your suds too hot. Some colored goods will run in very hot water, as in very cold.

FORMULA FOR WASHING COLORED GOODS

1. Run cold water into washer to show 4 inches in cylinder; give the clothes a five minutes' rinse. Discharge and drain well.

2. Turn on enough water of a temperature of 130° F. to give two inches in the cylinder. Add one to two pounds of Wyandotte Yellow Hoops in solution. Run this 15 minutes without soap. Discharge and drain well.

3. Turn on enough warm water of a temperature of 140° F. to give two inches in the cylinder. Add enough soap to make good suds. Run in this 20 to 30 minutes. Discharge and drain well.

4. Five minutes' hot rinse. Discharge and drain well.

5. Repeat the preceding.

6. Blue in the usual way.

FORMULA FOR WASHING BLACK SOCKS.

1. Run warm water into washer so as to give two to four inches in the cylinder, depending on the size of the load. Put in one to two pounds of Wyandotte Yellow Hoops, either dry or in solution, run 15 minutes and discharge.

2. Run warm water into washer so as to give two to four inches in the cylinder, depending on the size of the load. Add one pound Wyandotte Yellow Hoops, either dry or in solution. Run 15 minutes and discharge.

3. Run warm water into washer so as to give three to five inches in the cylinder. Run five minutes and discharge.

4. Repeat the preceding.

FORMULA FOR WASHING BLANKETS

This formula can be worked in the same way,

EXTRACTOR DEPARTMENT

where a rotary machine is used, set tubs or a bowl machine.

Prepare the water in the first tub in the same way as the first water in the machine and so on throughout the formula.

To secure the best results and clean the blankets thoroughly, we recommend the use of an olive oil soap, as it contains no free alkali.

In washing blankets, always have sufficient water to roll them, so there will be no drop in the machine, as the dropping has the tendency to full the blankets.

1. Run the required amount of water, at a temperature of 80 to 90 degrees, into the washer. Before the blankets are placed in the machine, add one to two gallons of Wyandotte Yellow Hoops solution, depending on the amount to be washed and the condition of the water. Place the blankets in the machine, run 10 minutes and discharge. This water, with the Wyandotte Yellow Hoops solution added, neutralizes any acids remaining in the blankets from previous washings and makes less soap necessary.

2. Run warm water of the same temperature into the washer, adding enough soap to make a lively suds. Run for 15 to 20 minutes, stop machine and discharge.

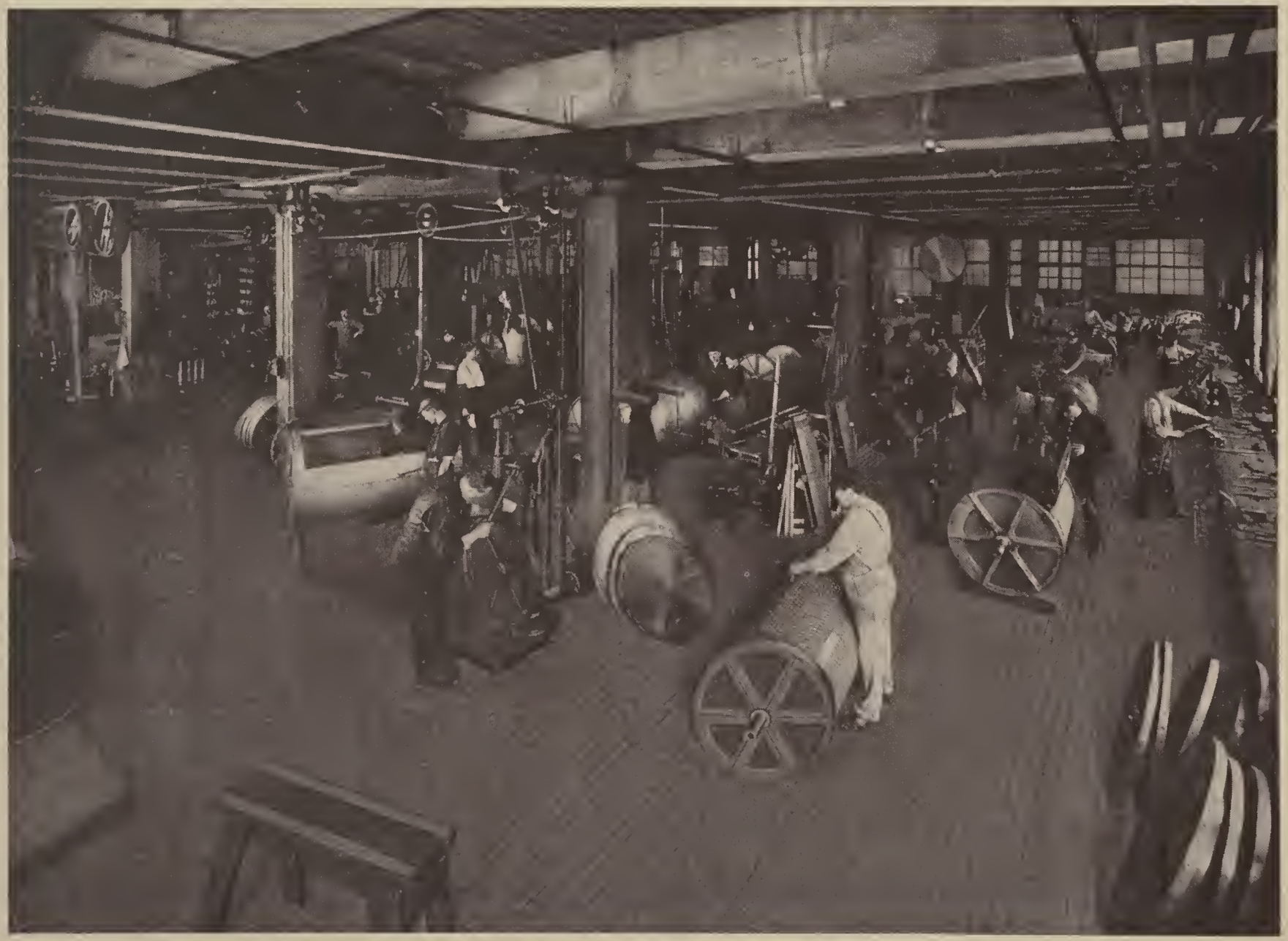
3. Run warm water of the same temperature into the washer and start it. Add a gallon of Wyandotte Yellow Hoops solution, run five minutes, stop machine and discharge.

4. Run warm water of the same temperature into the washer and start. Add from one to four ounces of acetic acid that has already been dissolved in a pail of water, or one ounce of sulphuric acid. (Where sulphuric acid is used, use one-fourth the amount of acetic acid, diluted in the same way.) Run five minutes, stop machine and discharge.

Caution. Be sure to stop the machine when changing rinses or adding soap, as the dropping of the woolens in the wheel without a sufficient amount of water will cause more or less shrinkage of the goods.

FORMULA FOR WASHING LACE CURTAINS

1. Run enough cold water into the washer to soak the curtains thoroughly. Put in Wyandotte Yellow Hoops, either dry or in solution, until the water feels soft. Run 10 to 15 minutes, stop machine and discharge.



METAL WASHER DEPARTMENT

2. Give five minutes rinse in lukewarm water, stop machine and discharge.

When the curtains are badly soiled, a ten minutes' suds should follow the preceding and a thorough rinse.

FORMULA FOR WASHING DARK AND DISCOLORED LINEN

This condition of linen is caused by the excessive use of strong and harsh alkalies in combination with soap and not properly rinsed, and where the fats have combined with the lime and magnesia in the water, forming an insoluble substance. This deposit and consequent discoloration can be removed by following this formula very carefully.

1. Run cold water into the washer so as to give six to eight inches in the cylinder. Run 10 minutes, discharge and drain well.

2. Run hot water into the washer so as to give two to four inches in the cylinder; add two quarts of acetic acid; turn on steam gradually and heat to 120° F. Run 20 minutes, discharge and drain well.

3. Run hot water into the washer so as to give two to four inches in the cylinder. Add five pounds of Wyandotte Yellow Hoops, either dry or in solution. Run 20 minutes, boiling the last 10 minutes, discharge and drain well.

4. Run hot water into the washer so as to give six to eight inches in the cylinder, run 10 minutes, discharge and drain well.

5. Repeat preceding.

6. Run hot water into the washer so as to give three to five inches in the cylinder. Dissolve eight ounces of oxalic acid in a pail used only for this purpose. After adding this oxalic acid, run the load 10 minutes. Turn on steam gradually and boil hard for 10 minutes. Discharge, drain well, rinse and blue in the usual way. If this does not bring back the color, boil 10 minutes longer.

FORMULA FOR WASHING COLORED ROUGH DRY

1. Run warm water into the washer so as to give four to six inches in the cylinder. Add two to three pounds of Wyandotte Yellow Hoops. Start the machine, run 15 minutes, stop and discharge.

2. Run warm water (120° F.) into the washer so as to give two to four inches in the cylinder. Add soap and run 15 to 20 minutes; stop and discharge.

3. Run hot water into the washer so as to give

BODY AND SHIRT IRONER DEPARTMENT

six to eight inches in the cylinder. Start machine, run five minutes and discharge.

4. Run cold water into the washer so as to give six to eight inches in the cylinder. Run five minutes, stop and discharge.

FORMULA FOR WASHING OVERALLS

100 Pairs of Overalls or Jackets

1. Run cold water into the washer so as to give eight inches in the cylinder. Start the machine, run 10 minutes and then discharge.

2. Repeat preceding.

3. Run warm water (160° F.) into the washer, so as to give three inches in the cylinder. Add five pounds of Wyandotte Yellow Hoops, placing this in the center of the goods after opening them up. Boil hard for 30 minutes. Discharge and drain well.

4. Run hot water into the washer so as to give eight inches in the cylinder. Run five minutes and discharge.

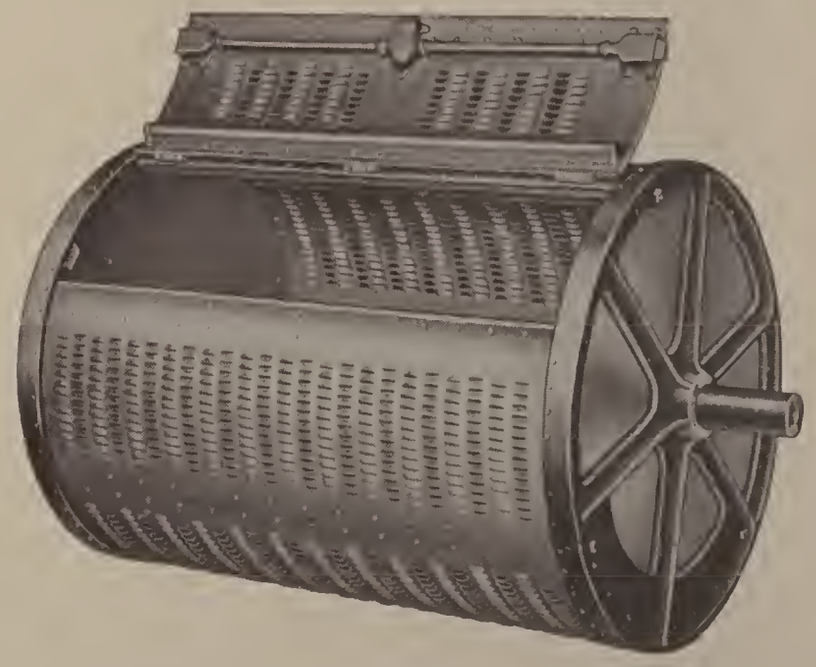
5. Run hot water into the washer so as to give five inches in the cylinder. Add three pounds of Wyandotte Yellow Hoops, boil hard for 30 minutes and discharge.

6. Run hot water into the washer so as to give eight inches in the cylinder. Put enough dry chip soap in center to make a good suds. Turn on steam gradually and bring to a boil. Run 30 minutes and discharge.

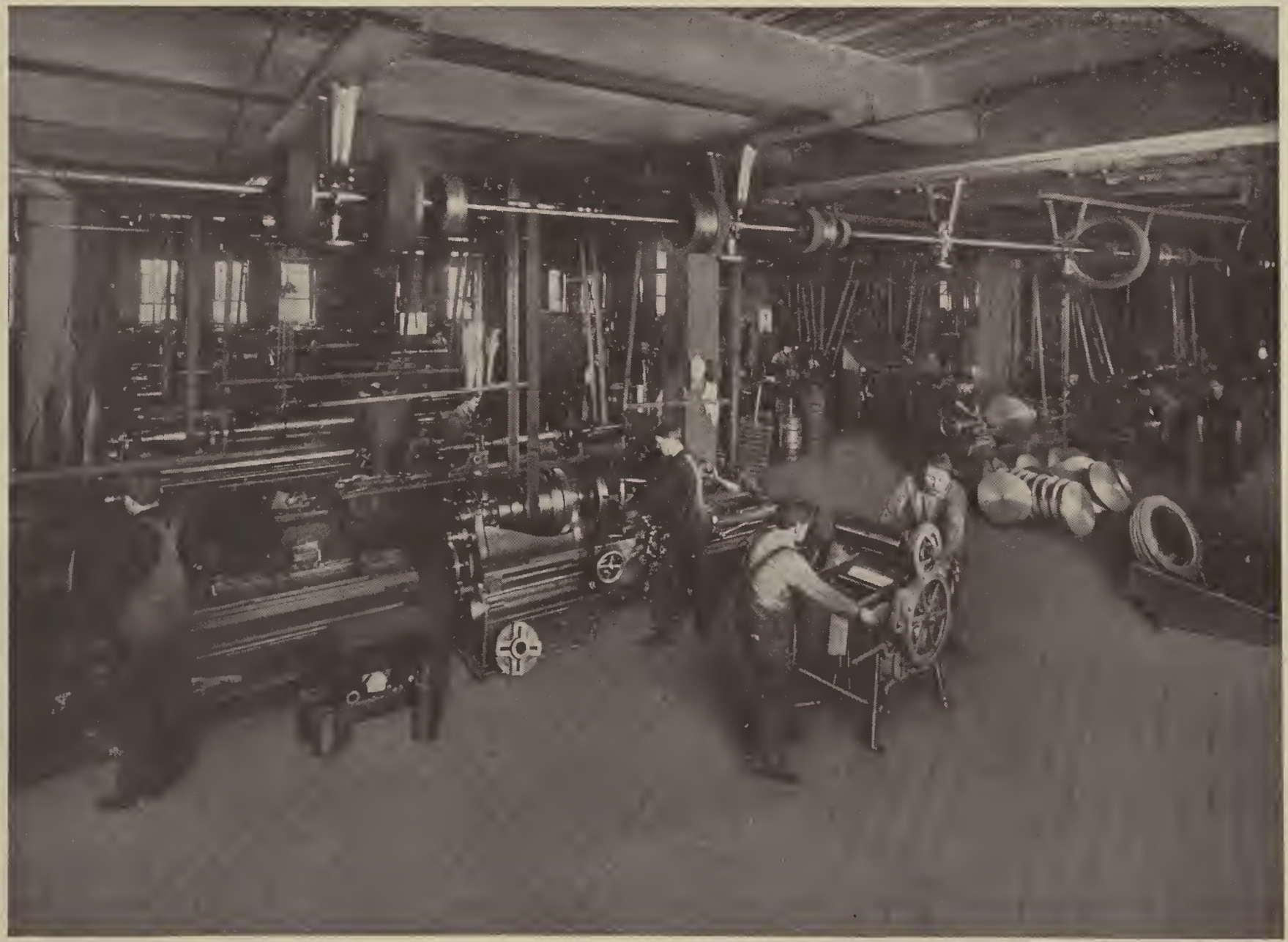
7. Hot rinse.

8. Hot rinse.

9. Cold rinse.



TROY TURBINE CYLINDER
Patents Applied For



MISCELLANEOUS DEPARTMENT

CHAPTER VI

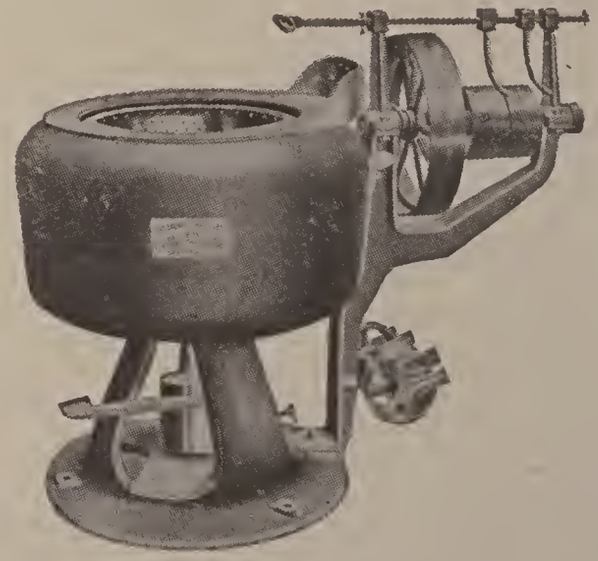
Extracting. — How to Load. — What Extractor Should Do.

In loading your extractor, place the heavy pieces, like spreads and bath towels, if possible, at the bottom of the basket and wind them around uniformly. Put in the goods in bunches, packing them reasonably tight. Do not leave any loose ends hanging out to be tangled up with the next bunch you put in. As you load, move the basket around and press the goods against the sides. No pieces will be "crossed" if these directions are followed, that is, the ends fastened by the weight of the load on opposite sides of the basket, causing the piece to be stretched tight as the basket revolves and to split frequently.

Load the extractor flush with the top, cover it with a round canvas three inches larger than the basket's top, put down the safety cover and start slowly. The cover will keep out dirt and keep the clothes in place.

The extractor should remove 66⅔ per cent of the water. Whether it is doing this or not can be determined by weighing the goods before extracting, then afterwards, and finally after the goods have been ironed.

To determine whether the extractor is traveling at the proper speed, put a board across the top inside the basket, supported from the bottom of the basket by another board; find the exact center of the cross piece and, when the machine is at full speed, hold a speedometer on the center spot.



SOLID CURB EXTRACTOR—COUNTERSHAFT ATTACHED

SHIRT IRONING MACHINERY DEPARTMENT

CHAPTER VII

Essential Facts About Starches.—Formulas for Preparation and Use.

WHEAT STARCH

The celebrated Wheat Starch which we handle has met with such general acceptance that it is not necessary to dwell upon its merits.

At the factory where it is manufactured, only perfectly sound flours are used, and great care is displayed in their selection. By a simple mechanical process, without the use of any chemical whatsoever, the starch is extracted from the flour in all its original strength, and this strength is maintained in the finished product, a result which necessarily cannot be secured by the older processes.

We claim for this starch the following advantages over all other starches:

1. It will cook up thinner, and will penetrate the fibre of the linen to be starched more readily than any other starch.

2. It will give a flexible, leathery finish not obtainable by the use of other starches.

3. Different degrees of stiffness in the work can easily be secured to meet any requirement.

4. Both time and labor are saved by its use. A careful record, if kept, cannot fail to satisfy any launderer on this point.

5. It will increase the capacity of your starching machines to a surprising degree.

6. It is stronger and will go further than any other starch.

THIN BOILING WHEAT STARCH

Use three-quarters to one pound of the starch to each gallon of water. Dissolve the starch thoroughly in a little of the cold water and put the rest of the water on to boil.

Stir the dissolved starch into the boiling water. When the mass comes to a "boil" again, let it boil altogether 30 minutes.

Use at once while hot and "thin."

FORMULA FOR MAKING WHEAT STARCH

Formula 1. Dissolve the starch thoroughly in cold water, in the proportion of three-fourths of a pound to one gallon of water. Cook it 30 min-

METAL DRYROOM. HAND EXTRACTOR AND STARCH COOKER DEPARTMENT

utes in a steam starch kettle. The starch will then be of the proper consistency for ordinary work. Never use more than three-fourths of a pound to a gallon of water, and if this makes your work too stiff, reduce the quantity.

Formula 2. Dissolve three pounds of wheat starch in three quarts of water; after this is dissolved add a half tablespoonful of lard and bluing, and boil in two and a half gallons of water for about ten minutes. This is a rubbing in starch for very fine work. For dip starch use one pound of the starch to a gallon of water.

Formula 3. Add enough water to three-fourths of a pail of wheat starch to fill the pail and let the starch dissolve; after it is dissolved boil in two and a half pails of water. This forms a very fine dip starch. For rubbing in add enough more starch to make a thicker jelly.

CORN STARCH

Cleanliness is first and absolutely indispensable in preparing starch. Be sure the vessel in which the starch is cooked is perfectly clean, so that no foreign substance whatever will enter into the starch. Mix the starch in proportion of 13 pounds of starch to 14 gallons of water. The starch should be boiled thoroughly for half an hour after it begins to boil.

Laundrymen must use their own judgment to a great extent as to how thick they desire the starch, but for ordinary laundry use the above has been found to be about the correct proportion.

For very thick rubbing starch use one pound of starch to a gallon of water, and in all instances let the starch boil thoroughly for one hour after it comes to a boil.

THIN BOILING WHEAT AND THIN BOILING CORN STARCH

Use one-half wheat and one-half corn or two-thirds wheat and one-third corn, and a total weight of three-quarters to one pound of the starches to each gallon of water.

Dissolve the starches separately in a little of the cold water and put the rest of the water on to boil, and use a small quantity of Japan wax.

Stir the wheat starch first into the boiling water; let it boil 20 minutes, and then stir in the thin boiling corn starch and boil ten minutes longer.

PATTERN DEPARTMENT

(Note.—To have uniform results, the starches should always be weighed and the water measured. This is *very* important.)

If thin boiling wheat starch is used with thin boiling corn starch, use half and half or two-thirds wheat and one-third corn. Dissolve together and boil 30 minutes.

Some laundrymen add to the starch a small quantity of Japan wax, spermacetti, parrafin wax, beeswax or gum arabic. The amount to be used can easily be determined by experimenting.

COMBINATION STARCH

The enormous sale and general use of Crystal Victor Starch (which is a mixture of wheat, corn and rice combined in the manufacture) shows that much better results can be obtained than by the hap-hazard manner of mixing in the laundry. It can be easily understood how a manufacturer with set scales and measures, provisions for selection of raw material, facilities for preparing the mixture, and a chemist of experience, whose one object is to obtain uniformity for each day's output to the standard set, could and should produce a combination that will eliminate all guess work from the laundry with few facilities and no practical training in the art of starch making.

COLD OR RAW STARCH

Only boiled, hot and generally thin cooking starch is used in the United States, but in England and on the Continent much work is done with raw starch. This method is antiquated and we by no means recommend it. Boiled, hot, thin starch is the only thing to use, but, as a matter of interest to laundrymen, we give a formula used by many English laundrymen:

A pound and a quarter of starch to one gallon of water. Add four ounces of borax and two tablespoonfuls of turpentine. Stir well before using.

YOU WILL ALWAYS OBTAIN UNIFORMITY IN USING TROY STARCHES.

APRON DEPARTMENT

CHAPTER VIII

Convenient Formulas for Removing Stains and Grease

TO REMOVE RED FRUIT STAINS FROM LINEN

Moisten the cloth and hold it over a piece of burning sulphur, then wash thoroughly, or the spots may reappear.

FORMULA NO. 2

Spread stained portion over bowl; pour boiling water on it from a height of perhaps eighteen inches to two feet.

TO REMOVE IRON RUST

To remove iron rust from uncolored cloth, moisten the stained part with hydrochloric acid diluted with about three volumes of water and warmed. Thoroughly rinse the cloth afterward in plenty of cold water. It is nearly impossible to remove such stains from some colored fabrics.

FORMULA NO. 2

Apply oxalic acid to the spot with fingers wet with water, then lay the article in the sun for a few hours, after which rinse thoroughly.

FORMULA NO. 3

Rub with a few grains of oxalic acid and then place over steam jet.

TO REMOVE INK STAINS

Ten grains of oxalic acid in one-half pint of water will remove all ink and fruit stains. Wet the article in hot water and apply it to the top of the bottle, so that the liquid will reach it, then rinse it well or cut the ink with chloroform, and wash it out with double strength ammonia.

FORMULA NO. 2

To take copying ink stains out of linen shirt bosoms, white duck suits, etc., make a strong solution of good bleaching powder (chlorinated lime) in cold water and apply to the stains; then apply a strong aqueous solution of oxalic acid (cold). Repeat, if necessary, until the stains disappear, then rinse thoroughly in chilled water.

FORMULA NO. 3

If the stain is fresh, place the stained portion in milk and allow to stand. If the milk becomes

WOOD WORKING DEPARTMENT

too much discolored, drain milk off and put on more. If stain is dry and will not come out as above, use salts of lemon or Javelle water; pour on, allow to stand for a few minutes and wash thoroughly.

TO REMOVE STAINS FROM MUSLIN

If boiling water is poured through the stains before wetting, they will disappear. Before fruit juice dries it can be removed by cold water, using a sponge and towel if necessary.

TO REMOVE IRON STAINS

Iron stains may be removed by the salts of lemon. Many stains may be removed by dipping the linen in sour buttermilk, and then drying it in the sun; wash it in cold water. Repeat this three or four times.

TO REMOVE GREASE SPOTS

Whenever oil of turpentine, benzole or ether is used to remove grease spots on cloth, the application should be made on the reverse side of the cloth by moistening it with the solvent in a circle surrounding the spot, so as to approach it gradually, having blotting paper (common brown wrapping paper) in contact with the spot of grease to absorb the fat immediately; otherwise the solvent will have the effect of spreading the grease over a large surface, instead of driving it out of the cloth. In the application of a hot iron to one side and paper to the other, the heat will drive the grease out of the cloth into the paper, because the fat has a tendency to move from the warm part toward the cooler.

FORMULA NO. 2

Wash white goods with soap or alkaline lyes; colored cotton, with lukewarm soap lyes; colored woolens, with the same or ammonia, with silks absorb with French chalk and dissolve away with benzine or ether.

TO REMOVE FISH STAINS

Fish stains can be removed in the same manner as any other oil or grease stains, although fish oil is somewhat more tenacious. Remove the spots before washing by means of benzine or ether. Make application on the reverse side, having blotting paper on the reverse side to absorb the grease.

WOOD WASHER DEPARTNENT

TO REMOVE MILDEW

Rub the stains thoroughly with a lemon cut in half, then spread in direct sunlight.

TO REMOVE GRASS STAINS

Grass stains may be removed from light fabrics by soaking in alcohol and rubbing briskly.

TO REMOVE PAINT

Rub with benzine, if wet; if dry, soak and soften with vaseline, then rub with benzine.

TO REMOVE TEA STAINS

Mix thoroughly soft soap and salt—say a tablespoonful of salt to a teacupful of soap—rub on the spots and expose to the sun. Let it lie two or three days, then wash. If the spots are wet occasionally while exposed to the sun it will hasten the bleaching.

TO REMOVE COFFEE, TEA OR CHOCOLATE STAINS

Place a bowl on the table, spread the stained part over it and pour boiling water on it from a height so as to strike the stain with force.

TO REMOVE WINE STAINS

Use salt and boiling water. Spread the stained portion over a bowl; pour boiling water on it from a height of perhaps eighteen inches to two feet.

TO REMOVE WAX STAINS

Place the goods on absorbent paper and press them with a hot iron.

TO REMOVE BLOOD STAINS

Wash in soap and warm (not hot) water; or rub cold raw starch on wet and allow to dry.

TO REMOVE OIL STAINS

Take three ounces of spirits of turpentine, and one ounce of essence of lemon, mix well, and apply as you would any other scouring drops. It will take out all the grease.

FORMULA NO. 2

Rub with cold water from the outside toward the center, using great care not to spread.

TO REMOVE STAINS OF PERSPIRATION

Place the garment in a soap solution and set in the sunshine. It is difficult to remove entirely and requires patience.

WOOD WASHER DEPARTMENT—CONTINUATION

TO REMOVE SCORCH STAINS

These marks can be removed by exposing the goods to the sun for a few hours.

TO REMOVE COAT CROCK

This is caused by dye from outer garments in which the color has not been properly set. It is most difficult to deal with, in some cases a pair of scissors being the only remedy.

The following is recommended as a sure cure for mild cases: Take 10 ounces of bleach (made in the proportion of four pounds of chloride of lime and four pounds of Wyandotte Yellow Hoops or one pound of caustic soda) to two gallons of hot suds. Mix and place the goods in the solution, leaving them for half an hour. Wash by the usual process.

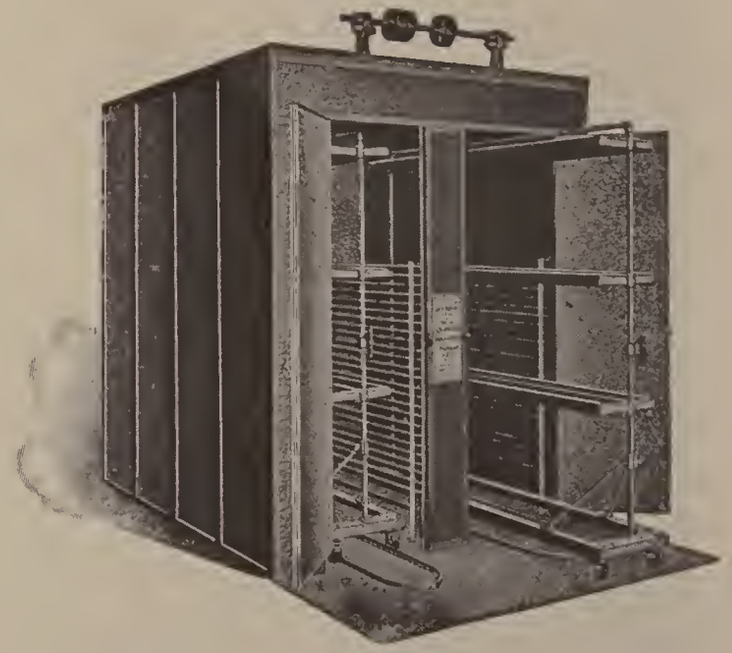
TO REMOVE THE ODOR OF IODOFORM

Get a small bottle of oil of citronilla and drop three or four drops in the first suds.

Another suggestion is to use caustic potash in the bleach instead of carbonates.

Ordinary vinegar has been used in one hospital with marked success.

A fourth remedy is the following: Place the goods in a 150 shirt wheel, run the usual amount of water into the wheel and add one-half pound ground mustard; run ten minutes and discharge; then proceed with the usual washing method.



TROY SECTIONAL DRYROOM—METAL

PACKING FLOORS—SHOWING DEPTH OF BUILDING

CHAPTER IX

Suggestions on Care of Machines. — Oils and Boiler Scale.

CARE OF MACHINES

Attention should be given the proper oiling of the machines, for they will give an endless amount of trouble if allowed to run dry. Operators, when through with a machine for the day, should wipe it with a little waste or other material, and clean off all the surplus oil or dirt that may have accumulated and cover the bed and rail with paper or cloth.

Great care should be observed in cleaning ironers. A clean soft bed is required, if you desire to obtain first-class results.

Special directions for setting up and operating our various machines will be mailed on application.

OILS

Select your oil for the work it has to do and the metal it has to lubricate; heavy journals need an oil with great cohesiveness and adhesiveness to the journal boxes, so as to make a cushion for the shaft to rest in; light spindles an oil with much less viscosity. A good lubricant should be free from corrosive action. Mixtures of vegetable and mineral oils are preferred as lubricants. The viscosity of the former is counteracted by the mineral oil, while the latter is rendered less corrosive by the mixture. Ten to fifteen parts of animal mixed with mineral oil make a good cylinder lubricant. Pure mineral and cotton-seed oils have a corrosive action on lead and its alloys; they are also easily affected by lard and whale oils.

Iron corrodes somewhat with mineral, less with seal and none with sperm oil. Tallow oil is the most corrosive on iron, cotton-seed next. Mineral oil does not affect copper; lard and seal oil should never be used on it. Tin is affected least by olive and most by cotton-seed oil.

PREVENTION OF BOILER SCALE

Throw one pound of powdered 98 per cent caustic soda for each ton of coal burned under the boiler into the feed-water of the boiler. For ordinary hard water this is amply sufficient. For very hard water take one and one-half pounds for

WOOD WORKING DEPARTMENT—WHERE MATERIAL IS CUT UP

each ton of coal burned. Use the blow-off tap freely. The lime which causes the hardness of the water is thrown down as a muddy sediment by the powdered caustic soda, and is thus removed, instead of sticking to the plates and tubes of the boiler as scale. The caustic soda being pure has no action on the plates or fittings of the boiler. As a powder it is easily weighed in exact quantities and dissolves instantly in cold water. When the package is opened it must be carefully covered up again and kept in a dry place, or the contents will become damp and moist.

The cost is far more than covered by the saving in fuel alone. A scale of one-eighth of an inch causes an increased consumption of fuel of 16 per cent; one-fourth of an inch 50 per cent. Half an inch scale increases the consumption of fuel 150 per cent.

CHAPTER X

Marking and Handling Laundry. — Fire Insurance.

SUGGESTIONS FOR MARKING AND HANDLING LAUNDRY WORK

It is very important that goods should be properly marked and sorted in the laundry. Nearly every laundryman has his own method. One which is used by many is to mark the full name of the customer on each article; a simpler method, however, is to use the letters of the alphabet and figures, as, for instance your first customer's name is James Arnold. This mark would be A 1. The next customer whose name began with Chas. Archibald, for example, would be A 2. The same order applies, of course, to every letter in the alphabet and it will readily be seen that the supply of marks is inexhaustible. A laundry would have to do a very large business before it would be required to use over four figures or characters.

Whatever system of marking may be used,

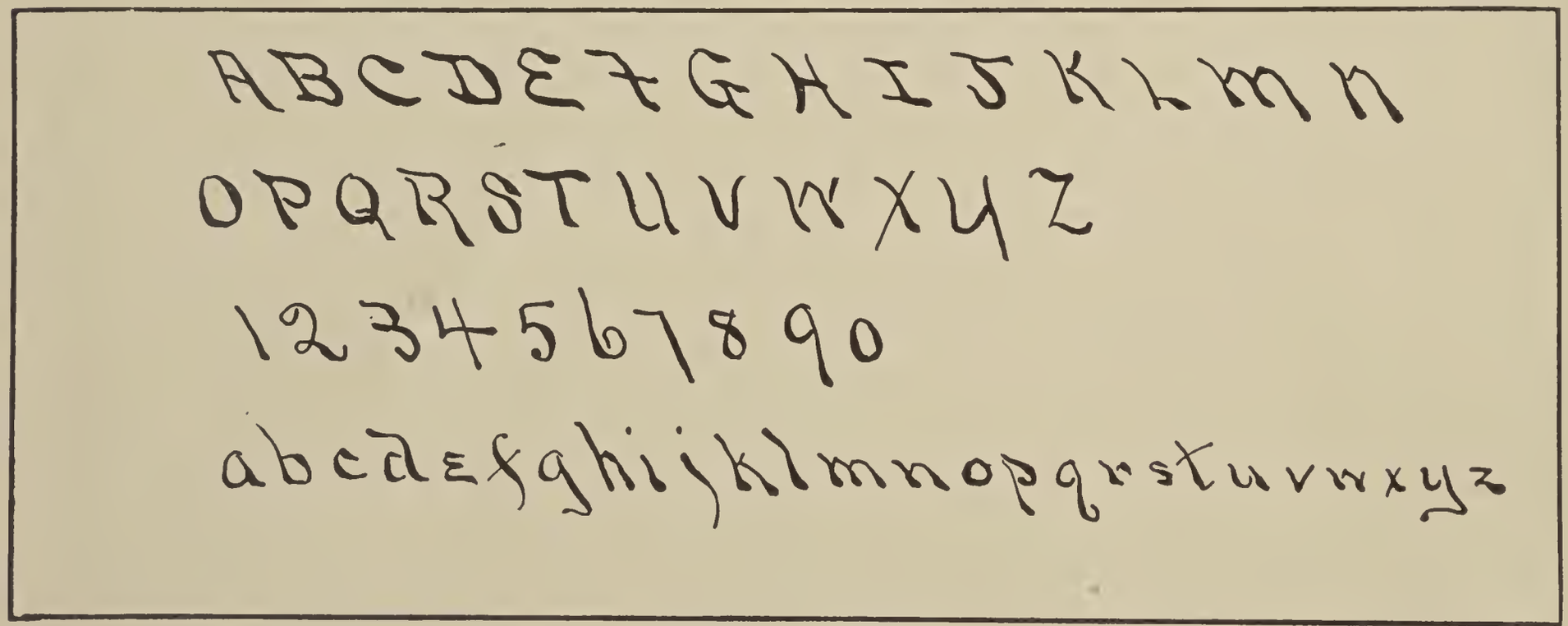
COPPER WORKING DEPARTMENT

however, we think it of great importance that the mark which is on the customer's clothes when they are at first brought to the laundry should be used if possible to identify his clothing and should not be crossed out and another substituted, for this is objectionable to most laundry customers. If two customers have the same mark one package can be easily held for another lot, and if the lots are properly handled, the two bundles will not be confused, but will reach the sorting table at different times.

A laundry record should always be kept, having not only the name of the customer with his address and the number of pieces contained in his package, but also showing the mark by which his clothes are identified. In no business is system more essential than in the laundry. Where it is lacking, not only is there confusion, but it is practically impossible to do a profitable business.

Work cannot be taken at all hours and all be finished at the same time. Goods that come in Saturday evening should go into the washer early Monday morning and all that is taken in up to 9 a. m. Monday should be nearly, if not completely, finished and on the sorting table by Monday night. Goods which go into the washer before 3 p. m. of any day should be starched and in the dryroom on the same day. All articles washed after 3 p. m. should be ready for the starchers when they begin work the next morning and be finished that night; therefore all goods that come in Monday will be finished and bundled Tuesday night and so on through the week, Tuesday's goods coming out Wednesday night and so on. All Friday's goods should be finished by special effort Saturday noon. By this system one can tell just when a customer's work should be done.

Lots should under no circumstances be allowed to become mixed, even if it is necessary to keep one lot in the dryroom until the lot before it is dry. Flannels and goods that are to be washed by hand should be given out in lots to the hand washers and returned by them in time to go into the dryroom with the balance of the lot. Care should be taken that the lots are dampened together. If a piece of goods is soiled in handling it should be washed out by hand, starched and dried at once, and if possible be brought to the sorting table before the lot to which it belongs is bundled. Such a soiled piece should not go through with another lot, but held.



MARKING ALPHABET

A MARKERS' TRAINING SCHOOL

The manager of one of Chicago's best laundries gives one or more cards, containing the letters of the alphabet, both capital and small letters, and the numerals, neatly printed to each employe with the request that all the spare minutes be put in practicing marking them. He arouses their interest at the start by explaining that the marking department is the most important in the whole laundry and the one that pays the most salary and that competent markers are always in demand.

When giving out the cards, he asks the employes to bring him samples of their work regularly for criticism and commendation. As a result, nearly every one in the plant is capable of doing the marking satisfactorily, if necessary.

The employes show remarkable interest. They put in the noon hour practicing their exercises, submit the results frequently to the foreman for criticism and make surprising progress.

FIRE INSURANCE

No laundryman can be too cautious about taking out insurance on his plant. As this important matter is very frequently left to the insurance agent, who oftentimes draws up a very careless form which does not cover all the articles intended to be covered by the policy, we would suggest the following form:

$.....on boilers, engines, machines, machinery, connections, setting, shafting, belting, pulleys, hangers, material and supplies, duplicate and spare parts, elevators, partitions, iron safes, furniture and fixtures of every discription, stationery, piping, dynamos, electric equipment, tools, implements, utensils, apparatus and appurtenances.

As the courts have repeatedly decided on fire insurance policies that the launderer has no more insurable interest in his customer's goods than the wagon maker has in your delivery wagon left with him for repairs, if burned while in his care, it is advisable, as it is consequently impossible to insure customers' goods in the regular fire insurance companies, to carry sufficient insurance on these goods in one of the different concerns especially organized to meet this kind of liability.

Take an inventory of your plant at least once a year and be in a position to prove your inventory. If you suffer a complete loss you will be sure to forget some fixture that is of value, and besides it clears you of suspicion as to actual value of your property.

SUPPLY DEPARTMENT

CHAPTER XI

Rules, Tables and Other Condensed Information. — Poisons and their Antidotes.

Laundrymen will frequently find the information contained in the following rules and tables very valuable:

RULES TO CALCULATE THE SPEED OF PULLEYS

Example 1. To find the size of the driving pulley: Multiply the diameter of the driver by the number of revolutions it should make and divide the product by the revolutions of the driver. The quotient will be the size of the driver.

Example 2. The diameter and revolutions of the driver being given, to find the diameter of the driver that shall make a given number of revolutions. Multiply the diameter of the driver by its number of revolutions and divide the product by the number of revolutions of the driver. The quotient will be the size of the driver.

Example 3. To find the number of revolutions of the driver pulley: Multiply the diameter of the driver by its number of revolutions and divide the product by the diameter of the driver. The quotient will be the number of revolutions of the driver.

Example 4. To find the speed of a countershaft: Multiply the speed of the line shaft by the diameters of the drivers, and divide the product by the product obtained by multiplying the diameters of the given pulleys. The quotient will be the speed of the countershaft.

HANDY METRIC TABLES

The following tables give the equivalents of both the metric and common systems and will be found convenient for reference:

PRINTING DEPARTMENT

	Approximate Equivalent.	Accurate. Equivalent.
1 inch (length)	2½ cubic centimeters	2.539
1 centimeter	0.4 inch	0.393
1 yard	1 meter	0.914
1 meter (39.3 inches)	1 yard	1.093
1 foot	30 centimeters	30.479
1 kilometer (1,000 meters)	⅝ mile	0.621
1 mile	1½ kilometer	1.600
1 gram (weight)	15½ grains	15.432
1 grain	0.064 gram	0.064
1 kilogram (1,000 grams)	2.2 pounds avoirdupois	2.204
1 pound avoirdupois	½ kilogram	0.453
1 ounce avoirdupois (437½ grains)	28⅓ grams	28.349
1 ounce Troy or Apoth. (480 grains)	31 grams	31.103
1 cubic centimeter (bulk)	.06 cubic inch	.060
1 cubic inch	16⅓ cubic centimeters	16.386
1 liter (1,000 cubic centimeters) 1 U. S. standard quart		0.946
1 U. S. quart	1 liter	1.057
1 fluid ounce	29½ cubic centimeters	29.570
1 hectare (10,000 sq. meters, surf.)	2½ acres	2.471
1 acre	0.4 hectare	0.40

It may not be generally known that we have in the nickel five-cent piece of our coinage a key to the tables of linear measures and weights. The diameter of this coin is two centimeters and its weight five grams. Five of them placed in a row will of course give the length of the diameter; two of them will weigh a decagram. As the kiloliter is a cubic meter, the key to the measure of length is also the key to the measures of capacity. Any person, therefore, who is fortunate enough to possess a nickel, may carry in his pocket the entire metric system of weights and measures.

LIGHTNING RULE FOR INTEREST

Multiply the principal by as many hundreds as there are days and for

4 per cent	divide by 90
5 per cent	divide by 72
6 per cent	divide by 60
7 per cent	divide by 52
8 per cent	divide by 45
9 per cent	divide by 40
10 per cent	divide by 36
12 per cent	divide by 30

Example: Interest on $144 for 169 days at 5%: 144×169=243.36, which divided by 72= $3.38, the required interest.

NEW YORK HOUSE, 33 WARREN STREET

TROY WEIGHT

24 grains make one pennyweight.
20 pennyweight make one ounce.

Only gold, silver and jewels are weighed by this. The ounce and pound in this are the same as in Apothecaries' weight.

APOTHECARIES' WEIGHT

20 grains make one scruple.
3 scruples make one dram.
8 drams make one ounce.
12 ounces make one pound.

AVOIRDUPOIS WEIGHT

6 drams make one ounce.
16 ounces make one pound.
25 pounds make one quarter.
4 quarters make one hundred weight.
2,000 pounds make one ton.

DRY MEASURE

2 pints make one quart.
8 quarts make one peck.
4 pecks make one bushel.
36 bushels make one chaldron.

LIQUID OR WINE MEASURE

4 gills make one pint.
2 pints make one quart.
4 quarts make one gallon.
31½ gallons make one barrel.
2 barrels make one hogshead.

TIME MEASURE

60 seconds make one minute.
60 minutes make one hour.
24 hours make one day.
7 days make one week.
4 weeks make one lunar month.
28, 29, 30 or 31 days make one calendar month.
52 weeks and one day, or 12 calendar months make one year.
365 days, 5 hours, 48 minutes and 49 seconds make one solar year.

CIRCULAR MEASURE

60 seconds make one minute.
60 minutes make one degree.
30 degrees make one sign.
90 degrees make one quadrant.
4 quadrants, or 360 degrees, make one circle.

NEW YORK OFFICE—FRONT VIEW

LONG MEASURE—DISTANCES

3 barleycorns make one inch.
12 inches make one foot.
3 feet make one yard.
5½ yards make one rod.
40 rods make one furlong.
8 furlongs make one mile.

CLOTH MEASURE

2¼ inches make one nail.
4 nails make one quarter.
4 quarters make one yard.

MISCELLANEOUS

3 inches make one palm.
4 inches make one hand.
6 inches make one span.
18 inches make one cubit.
21.8 inches make one bible cubit.
2½ feet make one military pace.

SQUARE MEASURE

144 square inches make one square foot.
9 square feet make one square yard.
30¼ square yards make one square rod.
40 square rods make one rood.
4 roods make one acre.

FACTS WORTH KNOWING

To find the diameter of a circle multiply the circumference by .31831.

To find the circumference of a circle multiply the diameter by 3.1416.

To find the area of a circle multiply the square of the diameter by .7854.

To find the surface of a ball, multiply the square of the diameter by 3.1416.

To find the side of an equal square multiply the diameter by .8862.

To find the cubic inches in a ball multiply the cube of the diameter by .5236.

Doubling the diameter of a pipe increases its capacity four times.

Double riveting is from 16 to 20 per cent stronger than single.

One cubic foot of anthracite coal weighs about 53 pounds.

One cubic foot of bituminous coal weighs from 47 to 50 pounds.

One ton of coal is equivalent to two cords of wood for steam purposes.

There are nine square feet of heating surface to each square foot of grate surface.

NEW YORK OFFICE—REAR VIEW

Each nominal horse-power of a boiler requires 30 to 35 pounds of water per hour.

A horse-power is equivalent to raising 33,000 pounds one foot per minute, or 550 pounds one foot per second.

The average consumption of coal for steam boilers is 12 pounds per hour for each square foot of grate surface.

To find the pressure in pounds per square inch of a column of water, multiply the height of the column in feet by .434.

Steam rising from water at its boiling point (212 degrees) has a pressure equal to the atmosphere (14.7 pounds to the square inch.)

In calculating the horse-power of steam boilers, consider for:

Tubular boilers, 15 square feet of heating surface, equivalent to one horse-power.

Flue boilers, 15 square feet of heating surface, equivalent to one horse-power.

Cylinder boilers, 10 square feet of heating surface, equivalent to one horse-power.

To evaporate one cubic foot of water requires the consumption of 7½ pounds of ordinary coal, or about one pound of coal to one gallon of water.

One-sixth of the tensile strength of plate multiplied by its thickness and divided by one-half the diameter of the boiler gives a safe working pressure for tubular boilers. For marine boilers add 20 per cent for drilled holes.

No plate or bars of either steel or iron should be worked at a black or blue heat (say about 500° F.); the material will stand far more strain either red hot or cold, while at all intermediate points great risks will be run and possible strains produced which will result in ruptures later on.

To find the capacity of tanks of any size, given dimensions of a cylinder in inches; to find its capacity in U. S. gallons, square the diameter, multiply by the length and by .0034.

To ascertain the heating surface in tubular boilers, multiply two-thirds the circumference of the boiler by the boiler's length in inches and add it to the area of all the tubes.

EASTERN WAREHOUSE, JERSEY CITY

The U. S. standard gallon contains 231 cubic inches, and weighs 8½ lbs. A cubic foot of water contains 7.48 gallons, and weighs 62½ pounds.

It is easy to calculate the contents of the tank in gallons in the following manner: Multiply the length, breadth and depth of the tank together; this will give the capacity of the tank in cubic feet; each cubic foot of water is equal to 6¼ gallons, consequently the cubical capacity of the tank requires to be multiplied by 6¼ to get the contents in gallons.

EXAMPLE: Suppose the tank measures 10 by 8 by 4 feet deep, the cubical capacity is therefore 320 cubic feet; this multiplied by 6¼ gives 2,000 gallons as the contents of the tank.

Diameters and Circumferences of Circles, and the Contents in Gallons at One Foot in Depth.

Diam.		Circ.		Area in Feet	Gallons.
Ft.	In.	Ft.	In.		1 Ft. Depth.
3	7	11	3	10.0846	75.4166
3	8	11	6⅛	10.5591	78.9652
3	9	11	9⅜	11.0446	82.5959
3	10	12	5½	11.5409	86.3074
3	11	12	3⅝	12.0481	90.1004
4	0	12	6¾	12.5664	93.9754
4	1	12	9⅞	13.0952	97.9310
4	2	13	1	13.6353	101.9701
4	3	13	4⅛	14.1862	103.0300
4	4	13	7¼	14.7479	110.2907
4	5	13	10½	15.3206	114.5735
4	6	14	1⅝	15.9043	118.9386
4	7	14	4⅝	16.4986	123.3830
4	8	14	7⅞	17.1041	127.9112
4	9	14	11	17.7205	132.5209
4	10	15	2⅛	18.3476	137.2105
4	11	15	5¼	18.9858	142.0582
5	0	15	8½	19.6350	146.8384
5	1	15	11⅝	20.2947	151.7718
5	2	16	2¾	20.9656	157.7891
5	3	16	5¾	21.6475	162.8896
5	4	16	9	22.3400	167.0674
5	5	17	⅛	23.0437	172 3300
5	6	17	3¼	23.7583	177.6740
5	7	17	6⅜	24.4835	183.0973
5	8	17	9⅝	25.2199	188.6045
5	9	18	¾	25.9672	194.1930
5	10	18	3⅞	26.7251	199.8610
5	11	18	7⅛	27.4943	205.6133
6	0	18	10⅓	28.2744	211.4472
6	3	19	7½	30.6796	229.4342
6	6	20	4⅞	33.1831	248.1564
6	9	21	2⅜	35.7847	267.6122
7	0	21	11⅜	38.4846	287.8032
7	3	22	9¼	41.2825	308 7270
7	6	23	6¾	44.1787	330.3859

SAN FRANCISCO HOUSE. 581-583 MISSION STREET

POSTAL INFORMATION

Domestic

First Class. Letters, United States postal cards, post cards manufactured by private persons, all matter sealed or otherwise closed against inspection, and all matter wholly or partly in writing, whether sealed or unsealed, 2 cents for each ounce or fraction thereof; U. S. postal cards and post cards, 1 cent each.

Second Class. Newspapers and other periodical publications, 1 cent for each four ounces.

Third Class. Books, newspapers and periodicals (other than second class), circulars, miscellaneous printed matter on paper not having the nature of personal correspondence, proof sheets, corrected proof sheets and manuscript copy accompanying the same, and matter in point print, or raised characters used by the blind, 1 cent for each 2 ounces or fraction thereof. Limit of weight, 4 pounds, except for a single book which may weigh more.

Fourth Class. All mailable matter not included in the three preceding classes, 1 cent for each ounce. or fraction thereof, except seeds, bulbs, roots, scions and plants, which are 1 cent for each 2 ounces or fraction.

These rates apply to Porto Rico, Hawaii, the Philippine Archipelago, Guam, Tutuila, the Canal Zone, Canada, Cuba, Mexico and the Republic of Panama.

Reforwarding. Letters will be forwarded at the written request of the person addressed from one postoffice to another, without additional charge for postage. Unclaimed packages cannot be returned to the sender until stamps for the return postage are sent.

MONEY ORDERS

Domestic

The charges are:

For orders for sums not exceeding $2.50, 3 cents.

Over $2.50 and not exceeding $5.00, 5 cents.
Over $5.00 and not exceeding $10.00, 8 cents.
Over $10.00 and not exceeding $20.00, 10 cents.
Over $20.00 and not exceeding $30.00, 12 cents.
Over $30.00 and not exceeding $40.00, 15 cents.
Over $40.00 and not exceeding $50.00, 18 cents.
Over $50.00 and not exceeding $60.00, 20 cents.
Over $60.00 and not exceeding $75.00, 25 cents.
Over $75.00 and not exceeding $100.00, 30 cents.

SAN FRANCISCO HOUSE—SHOWING OFFICE FACILITIES

REGISTRATION

Letters and packages can be registered on payment of a fee of 10 cents, which, with the full regular postage, must be prepaid by postage stamps. The name and address of the sender must be indorsed by him on each registered letter or package. Registered mail matter may be sent to any postoffice in the United States, Canada or any of the countries composing the Postal Union.

SPECIAL POISONS AND ANTIDOTES

Acids.—Muriatic, oxalic, acetic, sulphuric (oil of vitriol), nitric (aqua fortis), Antidotes—Soap suds, magnesia, lime water.

Prussic Acid.—Antidote—Ammonia in water. Dash water in face.

Carbolic Acid.—Antidotes—Flour and water, mucilaginous drink.

Alkalies.—Potash, lye, hartshorn, ammonia. Antidote—Vinegar or lemon juice in water.

Arsenic.—Rat poison, Paris green. Antidotes—Milk, raw eggs, sweet oil, lime water, flour and water.

Bug Poison.—Lead, saltpetre, corrosive sublimate, sugar of lead, blue vitriol. Antidotes—Whites of eggs, or milk in large doses.

Chloroform.—Chloral, ether. Antidote—Dash cold water on head and chest. Artificial respiration.

Carbonate of Soda.—Copperas, cobalt. Antidotes—Soap suds and mucilaginous drinks.

Iodine.—Antimony, tartar emetic. Antidotes—Starch and water astringent infusions. Strong tea.

Mercury and its Salts.—Antidotes—Whites of eggs, milk, mucilages.

Opium.—Morphine, laudanum, paregoric, soothing powders or syrups. Antidotes—Strong coffee, hot bath. Keep awake and moving at any cost.

SAN FRANCISCO HOUSE—SHOWING SHIPPING FACILITIES

INDEX

	PAGES
Bleach—How to Prepare	20–21
Bluing—Formulas	21–22
Boiler Scale—How Prevented	61–63
Condensed Information	69–79
Disinfecting	22
Extracting	45
Fire Insurance	65
Machines—Care of	61
Marking—Suggestions	63–67
Oils	61
Poisons and Antidotes	83
Postal Information	81–83
Soaps—Formulas for Making	9–20
Stains—How to Remove	53–59
Washing—Formulas for	22–43
Water—Methods of Softening	7
Water—Tests for Minerals and Alkalies	7–9